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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,407	07/25/2003	Norman Poirier	PCC115	2821
32047	7590	05/10/2005	EXAMINER	
GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC 55 SOUTH COMMERCIAL STREET MANCHESTER, NH 03101				SCHINDLER, DAVID M
ART UNIT		PAPER NUMBER		
		2862		

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/627,407	POIRIER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	David Schindler	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 25 April 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) 4-7 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-3 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 26 January 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    - a) All    b) Some \* c) None of:
      1. Certified copies of the priority documents have been received.
      2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
      3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

Bot Ledynh  
Primary Examiner

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 1/18/2005.

- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of invention I, claims 1-3 in the reply filed on 4/25/2005 is acknowledged.

***Priority***

2. It is noted that the priority date in the specification was corrected in an amendment filed by applicant, but the priority date stated in the Oath also appears to be incorrect. The date is stated as July 26, 2003 and should instead be July 26, 2002.

***Drawings***

3. The drawings are objected to because 1) the outputs of the Quadrature Oscillator in Figure 2 are shown to be "sin $\omega$ " and "cos $\omega$ " and should instead be "sin $\omega t$ " and "cos $\omega t$ ", 2) it is unclear which components in (203) comprise the modulator and which components in (203) comprise the PWM generator circuit as stated on line 16 of page 5 with the use of the phrase "a modulator and PWM generator circuit." Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief

description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Angular Position Sensing using Pulse Width Modulation.

5. The disclosure is objected to because of the following informalities:

Block (203) of Figure 2 appears to be designed with several names in the specification. In lines 22-24 of page 3 the block appears to be called a "phase angle pulse modulation circuit." This is repeated in the last line of page 4 and lines 1-3 of page 5. This block is also referred to as "a modulator and PWM generator circuit" on line 16 of page 5. The specification should be consistent with the terminology used to describe features in the drawings.

Block (203) is further unclear with the use of the phrase "a modulator and PWM generator circuit" to describe the block. The reason this phrase is unclear is that it is not

clear which circuitry is being described with the “a modulator” portion of the above phrase, and which circuitry is being described by the “PWM generator circuit” in the above phrase.

Appropriate correction is required.

### ***Claim Objections***

6. Claims 1 and 3 are objected to because of the following informalities:

As to Claims 1 and 3,

The phrase “a phase angle pulse modulation circuit and PWM generator circuit” stated on line 4 of Claim 1 and the phrase “said phase angle pulse modulation circuit and PWM generator circuit” state on lines 1-2 of Claim 3 is unclear. These phrases appears to relate to block (203) in Figure 2. This block appears to be designed with several names in the specification, as mentioned in the above specification objection.

As such, the phrases “a phase angle pulse modulation circuit and PWM generator circuit” on line 4 of claim 1 and the phrase “said phase angle pulse modulation circuit and PWM generator circuit” on lines 1-2 of claim 3 are unclear as it appears that the “PWM generator circuit” is a component of the “phase angle pulse modulation circuit.” For the purposes of examination, Examiner is assuming that the phrase “a modulator and PWM generator circuit” is correct and as such Examiner will use this phrase in place of “a phase angle pulse modulation circuit and PWM generator circuit” as stated on line 4 of claim 1. Examiner will also use the phrase “said modulator and PWM generator circuit” in place of “said phase angle modulation circuit and PWM generator

circuit" as stated on lines 1-2 of claim 3. Examiner has chosen this phrase because of the phrase "said modulator and PWM generator circuit" stated on lines 6-7 of Claim 1.

As to Claim 1,

The phrase "rotary sensor" on line 2 is awkward and it is recommended to change this phrase to "a rotary sensor."

As to Claim 3,

The term "adapted to" as stated on lines 3, 5, 7, and 9 is unclear as the claims are not positively recited with the use of this term. As an example, it is recommended to change the phrase "a quadrature oscillator adapted to generate a first signal" to "a quadrature oscillator which generates a first signal."

The phrase "said phase multiplier" on line 9 lacks antecedent basis and it is recommended to change this phrase to "said in phase multiplier."

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dukart et al. (5,880,586) in view of Madni et al. (6,304,076).

Dukart et al. discloses a rotary sensor including a magnet (2) rotating about an axis and a plurality of magnetic field sensors (5) angularly spaced about the axis (Figure 1), a PWM generator circuit (25) coupled to an input signal provided by each of the magnetic field sensors ((Column 5, Lines 1-3) and (Figure 4)), and a PWM to analog signal circuit (27) coupled to an output of the PWM generator circuit ((Figure 4) and (Column 6, Lines 48-64)).

Dukart et al. does not disclose a modulator and a PWM to analog signal circuit coupled to an output of the modulator.

Madni et al. discloses a modulator (42b) and a PWM to analog signal circuit (A4) coupled to an output of the modulator ((Figures 5 and 9) and (Column 3, Lines 45-53) and (Column 4, Lines 9-17)).

It would have been obvious at the time of the invention to modify Dukart et al. to include a modulator and a PWM to analog signal circuit coupled to an output of the modulator as taught by Madni et al. in order to provide an analog voltage output which is used to track rotation ((Column 4, Lines 14-21) and (Figure 12)).

It is noted that pulse-duration-modulation (PDM) is the same thing as pulse-width-modulation (PWM).

As to Claim 2,

Dukart et al. discloses the rotary sensor includes a first (6) and a second magnetic field sensor (7) spaced about 90 degrees apart about the axis ((Figures 1 and 2) and (Column 5, Lines 1-3)).

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9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dukart et al. (5,880,586) in view of Madni et al. (6,304,076) and in further view of Miyazaki (JP60162920A).

Dukart et al. in view of Madni et al. discloses as explained above.

Dukart et al. in view of Madni et al. does not disclose a quadrature oscillator adapted to generate a first signal equal to  $\sin\omega t$  and a second signal  $\cos\omega t$ ; an in phase multiplier adapted to multiply a sine input signal from the rotary sensor by the quadrature oscillator first signal; a quadrature multiplier adapted to multiply a cosine input signal from the rotary sensor by a quadrature oscillator second signal; and an adder circuit adapted to sum an output from the phase multiplier and an output from the quadrature multiplier.

Miyazaki discloses a quadrature oscillator (28) adapted to generate a first signal equal to  $\sin\omega t$  (Figure 3) and a second signal  $\cos\omega t$  (Figure 3), an in phase multiplier (26) adapted to multiply a sine input signal from the rotary sensor by the quadrature oscillator first signal (Figure 3); a quadrature multiplier (25) adapted to multiply a cosine input signal from the rotary sensor by a quadrature oscillator second signal (Figure 3), and an adder circuit (27) adapted to sum an output from the phase multiplier and an output from the quadrature multiplier (Abstract, Constitution, Lines 1-10).

It would have been obvious at the time of the invention to modify Dukart et al. in view of Madni et al. to include a quadrature oscillator adapted to generate a first signal equal to  $\sin\omega t$  and a second signal  $\cos\omega t$ ; an in phase multiplier adapted to multiply a sine input signal from the rotary sensor by the quadrature oscillator first signal; a

quadrature multiplier adapted to multiply a cosine input signal from the rotary sensor by a quadrature oscillator second signal; and an adder circuit adapted to sum an output from the phase multiplier and an output from the quadrature multiplier as taught by Miyazaki in order to attain precise detection (Abstract, Constitution, Last Line).

Note the location of the sensors relative to the rotating body in Miyazaki in comparison to those in applicants Figure 2. Also note Fout on page -112--, column 6, line 12.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat. No. 6,788,221 to Ely et al. which discloses an apparatus which processes a plurality of signals each of which vary sinusoidally.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
David Schindler



Bot Ledynh  
Primary Examiner